RANDOMIZED SUPERPIXELS TO ENHANCE MULTILEVEL IMAGE QUALITY IN ECONOMICAL, FAST INCREMENTAL-PRINTING ERROR DIFFUSION

ABSTRACT OF THE DISCLOSURE

While powerful in diffusion at one resolution to print photos at a finer resolution, the invention is not thus limited. It defines superpixels ("spels") for each desired colorimetric level, generates/receives image data, renders by finding levels for image positions, and prints an image using selected spels. One invention aspect finds a randomized value at each found level and uses the value to select the spel from plural ones for each level. Another aspect derives/maintains a randomized-value matrix; and maps a matrix location to an image position, to select a random value at that location and spel for that position. Another uses the value in common for all planes to select a spel for each plane at the found level — compatible spels for different planes, to coordinate color placement in planes. Another controls defining/selecting for a blue-noise property of spels in aggregate. In another, spels defined for a level vary in value to yield nonintegral color quanta. Preferences: Rendering is 1D per color, plus a dummy dimension holding the value (a least-significant bit from rendering, in a color dimension but decorrelated from levels) — and derives/maintains the matrix, derived/corrected for blue noise and including small interleaved 1D matrices tiled across and wrapped around the larger. Mapping uses values as pointers into dimensions of a spel table, and color-plane identification as a pointer into a third table dimension; it uses a common value in all planes to avoid drop-on-drop. Spels are Fourier-screened.